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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/568,536

02/17/2006

Kohei Suzuki

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EXAMINER

LEE, CYNTHIA K

ART UNIT

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1795

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/568,536	Applicant(s) SUZUKI ET AL.	
	Examiner CYNTHIA LEE	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 August 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 5-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Amendment

This Office Action is responsive to the amendment filed on 8/27/2009. Claims 1-3 and 5-16 are pending. Applicant's arguments have been considered. Claims 1-3 and 5-16 are finally rejected for reasons necessitated by applicant's amendment.

Information Disclosure Statement

The Information Disclosure Statement (IDS) filed 10/29/2009 has been placed in the application file and the information referred to therein has been considered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 5-10, 13, 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki (US 2002/0037450) in view of Delnick (US 5948464).

Suzuki discloses a lithium ion secondary battery comprising: a positive electrode capable of absorbing and desorbing lithium ion; a negative electrode capable of absorbing and desorbing lithium ion; a porous film interposed between said positive electrode and said negative electrode; and a non-aqueous electrolyte. Suzuki discloses

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a binder for the negative electrode as carboxymethylcellulose and styrene-butadiene rubber with 1.6 parts per 100 parts of active material (Applicant's claims 1 and 7).

Suzuki discloses a porous film, but does not disclose a film comprising an inorganic filler and a first binder, a content of said first binder in said porous film being 1.5 to 8 parts by weight per 100 parts by weight of said filler, said first binder comprises a first rubber including an acrylonitrile unit, said first rubber being water-insoluble and having a decomposition temperature of 250.degree. C. or higher (Applicant's claim 1). Delnick teaches a separator comprising solid particulate 32, such as silica, alumina, and titania (6:49) and a binder 34 (7:5-15). The separator provides good performance in a very thin thickness regime, thereby allowing cell scalability to dimensions previously unattainable and performance surpassing that of prior separators that contain particulate reinforcements (6:20-25). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the separator of Suzuki of inorganic solid particulate as taught by Delnick for the benefit of obtain a good performing separator with thin dimensions. The ratio of binder to solid particulate is 5/95 to 10/90 (7:27). MPEP states that prior art which teaches a range overlapping or touching the claimed range anticipates if the prior art range discloses the claimed range with "sufficient specificity." See 2131.03.

The inorganic filler of Delnick is alkaline on a surface because the separator comprising the inorganic filler is in direct contact with the electrolyte, and the electrolyte contains alkaline ions [0059].

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Regarding claim 9, Delnick does not expressly teach that said inorganic oxide has a specific surface area. It is noted that surface area (m^2/g) is equal to $1/(\text{density} \times \text{length})$ or $\text{m}^3/(\text{mass} \times \text{length})$. It is also noted that density is constant. Delnick teaches that that solid particulate size ranges from 0.01 μm to 1.0 μm (6:65-67). Delnick teaches that modifications can be made to the mixture to improve its dispersion and sizes suitable for the preferred printing processes (7:1-5). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the particle size of the solid particulate for the benefit of obtaining a good dispersion.

Regarding claim 14, Delnick teaches the separator thickness as being between 5-100 μm (9:17). In the case where the claimed ranges “overlap or lie inside ranges disclosed by the prior art” a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). See MPEP 2144.05.

Delnick does not disclose said first binder comprises a first rubber including an acrylonitrile-acrylate copolymer, said acrylate forming an acidic adhesive surface portion on a surface of the core-shell type particles, said first rubber being water-insoluble and having a decomposition temperature of 250.degree. C. or higher per se (Applicant's claim 1). Suzuki discloses a core-shell type rubber particle binder comprising an acrylonitrile-acrylate copolymer in a positive electrode [0031]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the binder as a separator binder as well since it has been held by the court that

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the selection of a known material based on its suitability for its intended use is *prima facie* obvious. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07. The core-shell type rubber particle comprising an acrylonitrile-acrylate copolymer has an acidic adhesive surface because it meets the structural limitations of Applicant's porous film.

Regarding claim 13, said positive electrode 2 and said negative electrode 3 are wound with said porous film 4 interposed therebetween. See fig. 1 of Suzuki.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki (US 2002/0037450) in view of Delnick (US 5948464) as applied to claim 1, further in view of Ota (US 6365300).

Suzuki modified by Delnick teaches all the limitations of claim 1 and are incorporated herein. Suzuki modified by Delnick does not disclose wherein a surface roughness of said porous film is less than a surface roughness of an electrode surface to which said porous film is adhered to. Ota teaches that surface roughness (R_{max}) of the negative electrode affects the battery performance considerably. It is desirable that the value of R_{max} be not less than 0.01 μm and not more than 5 μm . If less than 0.01 μm , good bonding with the electrolytic layer cannot be obtained, resulting in easy separation. In addition, smooth deposition and ionization of the metallic lithium may not be performed at the time of charge and discharge. It appears that the deposition and ionization are affected by the bonding with the electrolytic layer (10:1-10). It would have been obvious to one of ordinary skill in the art at the time the

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invention was made to roughen the surface of the electrodes of Suzuki for the benefit of good bonding between the electrode and the separator.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki (US 2002/0037450) in view of Delnick (US 5948464) as applied to claim 1, further in view of Hampden-Smith (US 2002/0168570).

Suzuki modified by Delnick teaches all the limitations of claim 1 and are incorporated herein. Suzuki modified by Delnick does not disclose a mixture of a large particle group and a small particle group of the inorganic filler. Hampden-Smith teaches of providing a battery powder batch having a bimodal particle size distribution. That is, the powder batch can include battery particles having two distinct and different average particle sizes. A bimodal particle size distribution can enhance the packing efficiency of the powder which is important for use as a battery electrode [0168]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the inorganic fillers of Delnick with two distinct particle sizes as taught by Hampden-Smith for the benefit of good packing ability.

Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki (US 2002/0037450) in view of Delnick (US 5948464) as applied to claim 1, further in view of Daroux (US 6562511).

Suzuki modified by Delnick teaches all the limitations of claim 1 and are incorporated herein. Suzuki modified by Delnick does not disclose a separator is

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further interposed between said positive electrode and said negative electrode.

Daroux teaches a separator for a Li-ion polymer battery comprised of a plurality of separator layers that are laminated together. The plurality of separator layers including a first layer formed of a first separator material, and a second layer formed of a second separator material, wherein the second layer is compositionally and structurally different from the first layer. See Abstract. The thickness of each separator is about 15 um to about 35 um (4:10). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the battery of Suzuki of two separators, as taught by Daroux, for the benefit of providing reinforced protection against puncture.

Response to Arguments

Applicant's arguments filed 8/27/2009 have been fully considered but they are not persuasive.

Applicant argues that Suzuki merely discloses using a core-shell type rubber particle as a binder for the positive electrode and does not suggest using it as a binder for the separator.

In response, it is noted that the core-shell type rubber particle of Suzuki is used as a binder in the positive electrode, and it is the Examiner's position that it would have been within the skill of an ordinary artisan to use the binder for the separator as well. It has been held by the court that the selection of a known material based on its suitability for its intended use is *prima facie* obvious. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07. In the instant case, using the

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binder of Suzuki as a binder for an electrode binder or a separator binder is *prima facie* obvious.

Applicant argues that core-shell type rubber particles that have acidic groups on their surface cause a decrease in battery performance, because the acidic groups capture lithium ions. However, when used in combination with an alkaline filler, the acidic groups are neutralized and do not suppress performance of the battery due to lithium ion capture.

It is noted that the combination of Suzuki and Delnick would necessarily possess this feature because all the claimed structural limitations have been met.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia Lee whose telephone number is 571-272-8699. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Cynthia Lee/

Examiner, Art Unit 1795

/PATRICK RYAN/

Supervisory Patent Examiner, Art
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